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A NOVEL APPROACH FOR DETECTION OF MOVING OBJECT FROM DYNAMIC SCENCES USING HMIiOL

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Abstract: *The main aim of this project is to detect the foreground object from dynamic scene. The topic of tolerating background motions while detecting foreground motions in dynamic scene is widely explored by the recent foreground detection literatures. This project detects the object based on the human–machine interaction in object level (HMIiOL) scheme. The HMIiOL can detect the object in very complex background by changing the conditions. The conditions are depending on background environment. A processor based on the HMIiOL-based foreground detection. It is used to increase throughput of the computationally intensive tasks in the algorithm. HMIiOL partitions frame into regions by the user knowledge and introduce the object appearance constraint and the object size constraint for each partitioned region. The TE method is presented to automatically compute an adapted threshold value by the object appearance constraint for each region. Using the adapted and region-varied threshold, detecting the dynamic background pixels as foreground pixels can be suppressed only by a low complexity based background modeling method. The rest of detected dynamic background pixels were removed by the object size constraint. . Object detection has applications in many areas of computer vision, including image retrieval and video surveillance.*

Key words*—Dynamic scene, foreground object detection, human– machine interaction in object level, very large-scale integration (VLSI).*

1. INTRODUCTION

Object detection is a computer technology related to computer vision and image processing that deals with detecting instances of semantic objects of a certain class (such as humans, buildings, or cars) in digital images and videos. Well-researched domains of object detection include face detection and pedestrian detection. Object detection has applications in many areas of computer vision, including image retrieval and video surveillance. Starting from an initial state and initial input (perhaps empty), the instructions describe a computation that, when executed, proceeds through a finite number of well-defined successive states, eventually producing "output" and terminating at a final ending state. The transition from one state to the next is not necessarily deterministic; some algorithms, known as randomized algorithms, incorporate random input. On the machine side, techniques in computer graphics, operating systems, programming languages, and development environments are relevant. On the human side, communication theory, graphic and industrial design disciplines, linguistics, social sciences, cognitive psychology, and human factors such as computer user satisfaction are relevant. Engineering and design methods are also relevant. Due to the multidisciplinary nature of HCI, people with different backgrounds contribute to its success. HCI is also sometimes referred to as man–machine interaction (MMI) or machine human interaction (MHI). Attention to human-machine interaction is important because poorly designed human-machine interfaces can lead to many unexpected problems. These techniques have been widely used in real-time video processing. However, the task becomes difficult when the background contains shadows and moving objects, e.g., wavering tree branches and moving escalators, and undergoes various changes, such as illumination changes and moved objects. A better way to tolerate the background variation in the video is to employ a Gaussian function that describes the color distribution of each pixel belonging to a stable background object The Gaussian model parameters are recursively updated in order to follow the gradual background changes in the video. The foreground detection is one of the major tasks in the field of Computer Vision whose aim detects changes in image sequences. Many applications do not need to know everything about the evolution of movement in a video sequence, but only require the information of changes in the scene. Detecting foreground to separate these changes taking place in the foreground of the background. It is a set of techniques that typically analyze the video sequences in real time and are recorded with a stationary camera. All detection techniques are based on the first model before the entire background of the image. That is, set the background and then see what changes occur in the background. Define it can be very difficult when it contains shapes, shadows and moving objects. Scenarios where these apply techniques tend to be very diverse. It can be highly variable sequences, images with very different lighting, interiors, exteriors, quality or less and up to a large number of possibilities. You need a system that, in addition to process in real time, is able to adapt to these changes. Foreground extraction is a widely used approach for detecting moving objects in videos from static cameras. The rationale in the approach is that of detecting the moving objects from the difference between the current frame and a reference frame, often called "background image", or "background model". Object detection is the process of finding instances of real-world objects such as faces, bicycles, and buildings in images or videos. Object detection algorithms typically use extracted features and learning algorithms to recognize instances of an object category. It is commonly used in applications such as image retrieval, security, surveillance, and automated vehicle parking systems. This technology has a variety of applications, such as military, police, and traffic management. Compared with ground-plane surveillance systems, aerial surveillance is more suitable for monitoring fast-moving targets and covers a much larger spatial area. Therefore, aerial surveillance systems become an excellent supplement of ground-plane surveillance systems. One of the main topics in intelligent aerial surveillance is vehicle detection and tracking. The challenges of vehicle detection in aerial surveillance include camera motions such as panning, tilting, and rotation. In addition, airborne platforms at different heights result in different sizes of target objects.

2. EXISTING SYSTEM

To distinguish foreground object from moving background object, a statistical model with high dimension is used to accommodate background object motions. Then, the foreground object is detected as those pixels that deviate from such a model. This procedure is called background modeling. The basic steps of background modeling algorithms are illustrated in Fig. 1. Crucial to all these steps are the choice of background model. Different type of background model can affect not only the detection performance but also the realization complexity in terms of memory requirement, data access bandwidth, and computational complexity. Although most erroneous results can be alleviated after conditional thresholding, to further remove these detections, the object size constraint is introduced. An adaptive background subtraction technique involves creating a background model and continuously upgrading it to avoid poor detection when there are changes in the environment. There are different techniques to model the background, which are directly related to the application. For example, in indoor environments with good lighting conditions and stationary cameras, it is possible to create a simple background model by temporally smoothing the sequence of acquired images over a short time. In Outdoor environments usually have high variability in scene conditions, thus it is necessary to have robust adaptive background models, even though these robust models are computationally more expensive.

3. PROPOSED SCHEME

A typical configuration of processing modules is illustrated in Fig. 1. These modules constitute the low-level building blocks necessary for any distributed surveillance system.

Fig. 1 *Traditional flow of processing in visual surveillance system*

3.1 OBJECT DETECTION

There are two main conventional approaches to object detection: 'temporal difference' and 'background subtraction' the first approach consists in the subtraction of two consecutive frames followed by thresholding. The second technique is based on the subtraction of a background or reference model and the current image followed by a labeling process. After applying one of these approaches, morphological operations are typically applied to reduce the noise of the image difference. The temporal difference technique has good performance in dynamic environments because it is very adaptive, but it has a poor performance on extracting all the relevant object pixels. On the other hand, background subtraction has better performance extracting object information but it is sensitive to dynamic changes in the environment. An adaptive background subtraction technique involves creating a background model and continuously upgrading it to avoid poor detection when there are changes in the environment. There are different techniques to model the background, which are directly related to the application. For example, in indoor environments with good lighting conditions and stationary cameras, it is possible to create a Simple background model by temporally smoothing the sequence of acquired images over a short time. In the case of groups of vehicle that stop, move perpendicular to the view of the camera, the algorithm is not able to detect vehicle. Furthermore, an object, with similar intensity characteristics to the front or rear of a object, is likely to generate a false positive. Another line of research is based on the detection of contours of object by using principal component analysis (PCA). Finally, as far as motion segmentation is concerned, techniques based on optic flow may be useful when a system uses moving cameras as in , although there are known problems when the image size of the objects to be tracked is small.

3.2 OBJECT RECOGNITION, TRACKING AND PERFORMANCE EVALUATION

Tracking techniques can be split into two main approaches: 2-D models with or without explicit shape models and 3-D models For example, in the 3-D geometrical models of a car, a van and a lorry are used to track vehicles on a highway. The model-based approach uses explicit a priori geometrical knowledge of the objects to follow, which in surveillance applications are usually people, vehicles or both. In the author uses two 2-D models to track cars: a rectangular model for a passing car that is close to the camera and a U-shape model for the rear of a car in the distance or just in front of the camera. The system consists of an image acquisition module, a lane and car detector, a process co-ordinator and a multiple car tracker. In some multi-camera systems like, the focus is on extracting trajectories, which are used to build a geometric and probabilistic model for long-term prediction, and not the object itself. The a priori knowledge can be obtained by computing the object's appearance as a function of its position relative to the camera. Once a priori knowledge is available, it may be utilized in a robust tracking algorithm dealing with varying conditions such as changing illumination, offering a better performance in solving (self) occlusions or (self) collisions. It is relatively simple to create constraints in the objects' appearance model by using model-based approaches; e.g. the constraint that people appear upright and in contact with the ground is commonly used in indoor and outdoor applications. The object recognition task then becomes a process of utilizing model-based techniques in an attempt to exploit such knowledge. A number of approaches can be applied to classify the new detected objects. The integrated system presented in and can recognize and track vehicles using a defined 3-D model of a vehicle, giving its position in the ground plane and its orientation. A common tracking method is to use a filtering mechanism to predict each movement of the recognized object. Another tracking approach consists in using connected components to segment the changes in the scene into different objects without any prior knowledge. The approach gives good performance when the object is small, with a low-resolution approximation, and the camera placement is chosen carefully.

3.3 BEHAVIOURAL ANALYSIS

The next stage of a surveillance system recognizes and understands activities and behaviors of the tracked objects this stage broadly corresponds to a classification problem of the time-varying feature data that are provided by the preceding stages. Therefore, it consists in matching a measured sequence to a pre-compiled library of labeled sequences that represent prototypical actions that need to be learnt by the system via training sequences. There are several approaches for matching time-varying data. Dynamic time warping (DTW) is a time-varying technique widely used in speech recognition, image patterns as in and recently in human movement patterns. It consists of matching a test pattern with a reference pattern. Although it is a robust technique, it is now less favoured than dynamic probabilistic network models. In the recognition of behaviors and activities is done using a declarative model to represent scenarios, and a logic-based approach to recognize predefined scenario models.

3.4 REVIEW OF SURVEILLANCE SYSTEMS

The previous Section reviewed some core computer vision techniques that are necessary for the detection and understanding of activity in the context of surveillance. It is important to highlight that the availability of a given technique or set of techniques is necessary but not sufficient to deploy a potentially large surveillance system, which implies networks of cameras and distribution of processing capacities to deal with the signals from these cameras. Therefore in this section we review what has been done to propose surveillance systems that address these requirements. The majority of the surveillance systems reviewed in this paper is based on transport or parking lot applications. This is because most reported distributed systems tend to originate from academic research which has tended to focus on these domains (e.g. by using university campuses for experimentation or the increasing research funding to investigate solutions in public transport).

4. SIMULATION AND RESULT

This job is implemented to find the moving object that means vehicles from the set input video frames. It is implement by using the mat lab and Xilinx. In this chapter the step by step procedure of this project is explained with screenshots and explanation. The first step of the job is to give the input frames as the input. The below figure is used as the input.

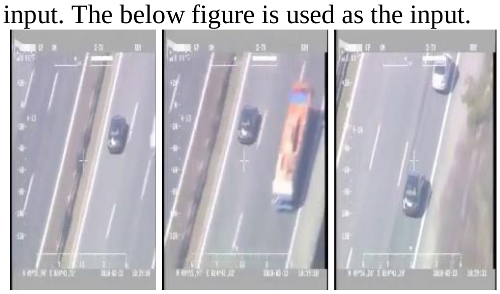

Figure 2: Input Frames

After getting the input frame the next step is subtract the back ground from each frame to find the moving object. To subtract the background this project use simple background algorithm. First get the first frame as of the frame folder. Then convert the image into the gray scale image. Then study the second frame from the frame folder. Then convert the second image into gray scale representation. Now subtract the first gray scale image from the second gray size image. If the subtracted value is superior to the threshold value it is considered as the moving article.

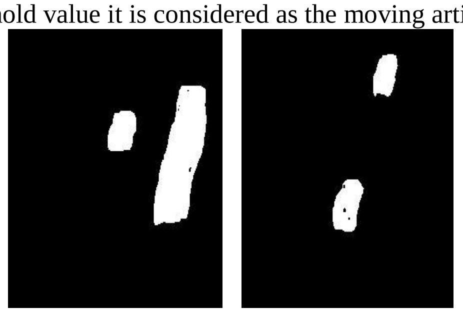

Figure 3: Output Frames

The affecting object is represented as the bright pixel. The background object is represented as the shady pixel. Afterward take the next frame from the frames folder. And precede the above steps until all frames are processed. And after with the purpose of estimate threshold for removing the unwanted object. After estimating the threshold the next step is to pertain the thresholding to remove the unwanted object. Finally the upshot is obtained.

5. CONCLUSION

In this venture only the vehicles are start from the input frames. In future, after finding the moving car, next will watch the traffic signals in red blush or not, reason the traffic signals materialize in red color the vehicle must not move. If it moves capture its license plate base on the geometrical approach and raises the beep sound. The allow plate in turn is stored for future reference.

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